

TSMC-02-212

February 9, 2004



To: Commissioner for Patents  
P.O.Box 1450  
Alexandria, VA 22313-1450

Fr: George O. Saile, Reg. No. 19,572  
28 Davis Avenue  
Poughkeepsie, N.Y. 12603

Subject: | Serial No. 10/714,998 11/17/03 |  
Bang-Chien Ho et al.  
WATER SOLUBLE NEGATIVE TONE  
PHTOTRESIST  
| \_\_\_\_\_ |

#### INFORMATION DISCLOSURE STATEMENT

Enclosed is Form PTO-1449, Information Disclosure Citation  
In An Application.

The following Patents and/or Publications are submitted to  
comply with the duty of disclosure under CFR 1.97-1.99 and  
37 CFR 1.56.

#### CERTIFICATE OF MAILING

I hereby certify that this correspondence is being  
deposited with the United States Postal Service as first class  
mail in an envelope addressed to: Commissioner for Patents,  
P.O. Box 1450, Alexandria, VA 22313-1450, on February , 2004.

Stephen B. Ackerman, Reg.# 37761

Signature/Date Stephen B Ackerman 2/12/04

U.S. Patent 5,573,634 to Ham, "Method for Forming Contact Holes of a Semiconductor Device," discusses a method of forming smaller contact holes by a double exposure process.

U.S. Patent 5,017,461 to Abe, "Formation of a Negative Resist Pattern Utilize Water-soluble Polymeric Material and Photoacid Generator," describes a water soluble negative tone composition based on a polyvinyl alcohol (PVA) and an acid generator that is a diazonium salt.

U.S. Patent 5,998,092 to McCulloch et al., "Water Soluble Negative-working Photoresist Composition," discusses a water soluble negative resist that does not rely on a crosslinking mechanism.

U.S. Patent 5,948,592 to Umehara et al., "Water-soluble Photoresist Composition," describes a water soluble resist that is compatible with a crosslinking mechanism.

U.S. Patent 5,532,113 to Frechet et al., "Method of Making Microelectronic Structures Utilizing Photoresists Containing C3C12 Water Soluble Sugar Crosslinking Agents," discusses a photoresist including crosslinking agents, and crosslinking agents for such formulations.

U.S. Patent 5,536,616 to Frechet et al., "Photoresists Containing Water Soluble Sugar Cross-linking Agents," discusses photoresists including crosslinking agents, and crosslinking agents for such formulations.

U.S. Patent 5,648,196 to Frechet et al., "Water-soluble Photoinitiators," describes a water soluble photoacid generator (PAG) .

U.S. Patent 5,858,620 to Ishibashi et al., "Semiconductor Device and Method for Manufacturing the Same," discusses a crosslinking formulation in which a water soluble polymer and crosslinker are coated on a patterned layer containing acid that has a hole with a space width of about 400nm.

U.S. Patent 6,319,853 to Ishibashi et al., "Method of Manufacturing a Semiconductor Device Using a Minute Resist Pattern, and a Semiconductor Device Manufactured Thereby," describes a crosslinking mechanism to shrink a 200 nm space to a 110 nm space width.

Co-pending U.S. Patent TSMC-01-376, "Improvement of Contact Hole Printing by Packing and Unpacking," Serial # 10/002,986, filed on 11/30/01, assigned to the same assignee, discusses a method of improved contact hole creation for ultra-small contact holes.

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U.S. Patent TSMC-01-463, Serial # 10/005,806, filed on 12/05/01, now issued as US 6,664,011, "Hole Printing by Packing and Unpacking Using Alternating Phase-shifting Masks," to Lin et al., discusses a method for the creation of contact holes.

Co-pending U.S. Patent TSMC-02-162, Serial # 10/443,359, filed on 05/22/03, "Water Soluble Negative Tone Photoresist," assigned to the same assignee, discusses the particular chemistries for negative photoresist.

Co-pending U.S. Patent TSMC-02-211, Serial # 10/268,586, filed on 10/10/02, "Method for Preventing the Etch Transfer of Sidelobes in Contact Hole Patterns," assigned to the same assignee, discusses a method of forming a pattern in a substrate that is free of surface damage or divots caused by an etch transfer of sidelobes from a photoresist layer.

Sincerely,

A handwritten signature in cursive script that reads "Stephen B. Ackerman".

Stephen B. Ackerman,  
Reg. No. 37761

Form PTO-1449

Document Number (Optional)

Application Number

TSMC-02-212

10/714,998

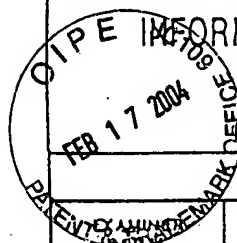
Applicant

Bang-Chien Ho et al.

Filing Date

11/17/03

Group Art Unit



# INFORMATION DISCLOSURE CITATION IN AN APPLICATION

(Use several sheets if necessary)

## U. S. PATENT DOCUMENTS

DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
5573634	11/12/96	Ham	156	659.11	12/22/94
6664011	12/16/03	Lin et al.	430	5	12/5/01
5017461	5/21/91	Abe	430	325	3/13/89
5998092	12/7/99	McCulloch et al.	430	270.1	5/27/98
5948592	9/7/99	Umehara et al.	430	270.1	7/7/98
5532113	7/2/96	Frechet et al.	430	296	9/21/95
5536616	7/16/96	Frechet et al.	430	191	9/21/94
5648196	7/15/97	Frechet et al.	430	270.1	7/14/95
5858620	1/12/99	Ishibashi et al.	430	313	1/24/97
6319853	11/20/01	Ishibashi et al.	438	780	3/29/00

## FOREIGN PATENT DOCUMENTS

DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation	
					YES	NO

## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

-	Co-pending U.S. Patent TSMC-01-376, Serial # 10/002,986, filed on 11/30/01, same assignee, "Improvement of Contact Hole Printing by Packing and Unpacking."
-	Co-pending U.S. Patent TSMC-02-162, Serial # 10/443,359, filed on 05/22/03, same assignee, "Water Soluble Negative Tone Photoresist."

EXAMINER

DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.

Form PTO-1449

Docket Number (Specimen)

Application Number

TSMC-02-212

10 | 714,998

Applicant:

Bang-Chien Ho et al.

Filing Date

11/17/03

Group Art Unit

INFORMATION DISCLOSURE CITATION  
IN AN APPLICATION

FEB 17 2004

(Use several sheets if necessary)

## U. S. PATENT DOCUMENTS

[illegible]

## FOREIGN PATENT DOCUMENTS

[illegible]

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

- Co-pending U.S. Patent TSMC-02-211, Serial # 10/268,586, filed on 10/10/02, same assignee, "Method for Preventing the Etch Transfer of Sidelobes in Contact Hole Patterns."

EXAMINED

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